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ABSTRACT

The retention of qualified faculty is an important factor in maintaining the identity and professional climate of a medical school. In studying faculty mobility from the institutional point of view, data on faculty attrition is closely examined. A faculty coefficient for each medical school was determined by the ratio of the number of salaried faculty in the school that year. Twenty-seven variables were selected to predict faculty attrition. These variables fall into four broad categories: size of institution, faculty variables, financial variables, and miscellaneous variables. The most notable finding reflects the low correlation of the 27 institutional predictor variables with the criterion. It may be that other institutional variables were not included in the present study that related to faculty attrition, or that few variables capture the variance in common among medical schools regarding faculty attrition. The age of the institution and percent of foreign medical graduates on staff were effective independently in predicting high faculty attrition. (Author/KE)

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INSTITUTIONAL VARIABLES RELATED TO HIGH FACULTY ATTRITION

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Effective May 5, 1975, a reorganization of the Health Resources Administration divided the former Bureau of Health Resources Development into two new components – the Bureau of Health Manpower and the Bureau of Health Planning and Resources Development. The material described in this publication was prepared in BHRD, and now falls within the purview of the new Bureau of Health Manpower.

AAMC Faculty Mobility Series: Report 3
Institutional Variables Related to High Faculty Attrition

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FOREWORD

A major mission of the Bureau of Health Resources Development (BHRD)* is assuring the development of an adequate supply of well-qualified health manpower for the Nation. To help carry out this mission, the Bureau provides financial support for the institutions training health manpower. This support has been of three types: Assistance for the construction and renovation of facilities; student assistance through loans, scholarships, traineeships, and fellowships; and assistance for the operation, expansion, and improvement of the schools (including support of faculty).

In recent years, as the cost of medical education burgeoned and Federal contributions rose, there has been a growing concern over the impact of Federal funding on the institutions training health manpower, especially upon the supply, qualifications, and retention of faculty – its role models, recognition of its importance, etc. Under terms of a contract (No. MI-24401) with BHRD, the Association of American Medical Colleges (AAMC) agreed to carry out a series of studies of medical school faculty. These studies were in large part based on data in a Faculty Roster System maintained by the Association for all 114 medical schools in the United States.

A medical school faculty profile project was initiated in 1966 by the AAMC in cooperation with the National Institutes of Health. In the early years of the project's operation, faculty profile data were obtained by annual questionnaires sent to all medical schools. Under the contract with BHRD, a computerized Faculty Roster System was developed which provides for the immediate input of information by each medical school upon the accession of each new faculty member, each transfer or other departure as well as each change in status of a faculty member. The Faculty Roster System of the AAMC contains information on the demographic, educational, and professional characteristics of almost 50,000 past and present salaried faculty members.

This report "Institutional Variables Related to High Faculty Attrition", is one of five reports covering various aspects of medical school faculty which have been prepared by the AAMC under its contract with BHRD. The first two reports in the series dealt with faculty mobility principally in terms of the characteristics of faculty members.

This third study is concerned with faculty mobility from the institutional point of view. The retention of qualified faculty is an important factor in maintaining the identity and professional climate of a medical school. An inordinately large number of faculty members leaving in a given year may have significant impact on the functioning of the medical school and on the students. This study was undertaken in order to assist medical school administrators in understanding more clearly some of the institutional characteristics related to high faculty attrition.

In this study, the authors examined closely data on faculty attrition, defined as a loss of salaried faculty for reasons other than leave, retirement, or death. A faculty "coefficient" for each medical school was determined by the ratio of the number of salaried faculty who departed in 1970 to the total number of salaried faculty in the school in that year. The study is based on 95 medical schools which had at least 10 salaried faculty in 1970 and for which substantially complete data were available. Twenty-seven variables were selected to

* The Bureau of Health Resources Development (BHRD) became the Bureau of Health Manpower (BHM) on May 5, 1975.

predict faculty attrition. These variables fall into four broad categories: Size of institution, faculty variables, financial variables, and miscellaneous variables.

This report was prepared by Dr. Philip W. Anderson, Staff Associate, and Mr. Thomas A. Larson, Director, Faculty Profiles in the Division of Operational Studies, Department of Planning and Policy Development at the Association of American Medical Colleges. The report is being published by the Resource Analysis Staff, Howard V. Stambler, Chief.

The five reports in the series are:

- Mobility Characteristics of U.S. Medical School Faculty in 1971.
- A Preliminary Analysis of Differential Characteristics Between High and Low Mobile Medical School Faculty.
- Institutional Variables Related to High Faculty Attrition.
- Medical School Characteristics Associated With Faculty Participation in Federal Programs.
- Postdoctorals vs. Nonpostdoctorals: Career Performance Differentials Within Academic Medicine.

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PURPOSE AND SCOPE

Descriptive and analytical studies of faculty have been conducted by many diverse institutions and organizations concerned with higher education. In 1969, the Bureau of Health Manpower Education, a component of the National Institutes of Health, requested the Association of American Medical Colleges to undertake an analysis of faculty manpower at academic health centers within the United States. Since that time, the Division of Operational Studies of the AAMC has held the responsibility for the collection and dissemination of data to describe and assess the "intellectual capital" of medical education, i.e., to study the source of faculty and the circumstances of their training, the nature of the flow of persons from one institution to another, and the reasons for departure from medical academia.

The Faculty Profile staff of the Division of Operational Studies has recently completed studies relating to the mobility or movement of faculty into, within, and out of academic health centers.

The retention of high-quality staff are fundamental to the maintenance of the research, teaching, administrative and/or patient care capabilities of a medical school. The present study attempted to identify institutional characteristics which may be associated with high levels of faculty attrition. Faculty attrition was defined as a loss of salaried faculty at a medical school for reasons other than leave, retirement or death. Employing this definition, it was noted that 2,210 faculty left jobs for other employment in 1970. The faculty attrition coefficient for each of the 95 medical schools included in the study was determined by dividing the total number of salaried faculty who left in 1970 by the total number of 1970 salaried faculty for a given school.

The model used for predicting faculty attrition (criterion) using multiple predictors was Step-wise Multiple Regression. The 27 institutional predictor variables were categorized into four general areas: size variables, financial variables, faculty variables, and miscellaneous variables.

HIGHLIGHTS

(1) The 95 medical schools included in this study experienced faculty attrition rates from 0. to 23.5 percent, the mean being 7.

(2) Only two of the 27 institutional variables, namely, age of institution and percent foreign medical graduates on staff were effective independently in predicting high faculty attrition.

(3) Step-wise Multiple Regression procedures indicated that four variables optimally predicted the criterion, though these four only accounted for 22 percent of the variance. The positive and negative weights from these variables suggested that medical schools that have a high degree of faculty attrition differ from other medical schools by having more foreign medical graduates on staff, were established at an earlier date, but have younger associate professors and tend to have fewer faculty who are graduates of that institution.

Report 3: Institutional Variables Related to High Faculty Attrition

INTRODUCTION

The retention of qualified faculty at U.S. medical schools has recently been the subject of a good deal of attention.

A large number of faculty leaving a medical school in a given year may have significant impact on the functioning of the school. If one can assume that faculty contribute to the identity or professional climate of a medical school, then high faculty attrition may alter that identity by reducing the research, teaching, administrative and/or patient care capabilities of that school.

Visscher (1962) noted that recruitment and retention of high-quality staff were major elements in any discussion of the impact of research dollars on medical teaching facilities. Moreover, Harrell (1967) noted that faculty are increasingly becoming specialized, even in the basic sciences. He further stated that it is becoming difficult to find faculty with broad training who can teach several subjects within a single discipline. The loss of faculty members who have contributed unique knowledge to the educational program of a medical school could seriously impair a well-rounded educational program.

According to Smythe (1970) academic departments of medical schools are required to recruit and retain faculty of sufficient quality and experience. This requirement is a concern, too, of the Liaison Committee on Medical Education.[1]

> "The faculty must consist of a sufficient number of skilled teachers and investigators from the Biological, Behavioral, and Clinical Sciences to implement the objectives that each medical school adopts for itself" (p. 7)

Not only does high faculty attrition have a potentially serious effect on the implementation of the educational or research objectives of a school, it is also expensive.

Smythe (1970) noted that the average expenditure per full-time faculty was $50,000 per year in 1967. According to his data, in only five of 140 component academic departments for which data were available was the ratio of expenditure less than $25,000 per faculty member per year; whereas, expenditures of over $75,000 per member per year were frequent. Smythe concluded that funding targets for full-time faculty members should be considered in terms of a minimum of $50,000 per year. This estimate may be a low in light of the recent national challenge to the nation's medical schools to increase departments and faculty directed toward

comprehensive family medical care. A report by the Coordinating Council on Medical Education[2] suggests that there will be additional costs in providing faculty and services to operate models of care and to provide educational programs in comprehensive medicine.

It is evident that the maintenance and development of faculty is an expensive charge for medical schools, and those schools incurring a large loss of faculty each year suffer the most.

The present study will attempt to identify institutional characteristics associated with high levels of faculty attrition. One would hope that the results of this study will assist medical school administrators in understanding more clearly some of the institutional predictors related to high faculty attrition.

Prior Research

After reviewing the literature on faculty attrition and mobility, Blackburn and Aurand (1972) and Anderson and Larson (1972) concluded that there was a lack of relevant research on these phenomena at medical schools. However, a few studies are of general interest to the present investigation.

Considerations other than supply and demand are important in faculty job movement. Elements related to the job and to the environment play a major role. (Brown, 1967; Anderson and Larson, 1974). Other influential conditions related to job satisfaction or dissatisfaction are colleague competence, academic freedom, research facilities and curriculum (Gustad, 1960; Cammack, 1965; Brown, 1967).

Shapiro (1971) concluded that in general, the greater the district size and growth rate surrounding an institution, the smaller the faculty turnover. According to Caplow and McGee (1958), job changes for 76 to 78 percent of college faculty involves some dissatisfaction with the work or the institution.

A high degree of collegiality appears necessary for the retention of faculty. Pankin (1972) noted that collegiality is more likely to be present at lower turnover schools. McGee (1971) found that among those indicating some dissatisfaction with their jobs, 57 percent referred to some feature of the internal structure of the institution.

While variables related to collegiality or the internal structure of a given medical school were not collected for this survey, other institutional variables, not previously explored, will be used in an attempt to further explain faculty attrition.

METHOD

In the present study, faculty attrition is defined as a loss of salaried faculty at a medical school for reasons other than leave, retirement or death. Table 1 shows the immediate employment plans of faculty who left salaried positions at U.S. Medical Schools from 1970 to 1971. It can be seen that a reported 2,210 faculty left their jobs for other employment in 1970. Thirty-eight percent of the leavers planned to stay in academe by transferring to other medical or non-medical schools. Another 14 percent plan to maintain contact with their former school of employment in a volunteer capacity.

The data used to compute faculty attrition (the criterion) for the schools included in the present study were previously reported by Anderson and Larson (1974)[3]. The faculty attrition coefficient for each medical school was determined by dividing the total number of salaried faculty who left in 1970 by the total number of 1970 salaried faculty for a given school.

Institutional variables used to predict faculty attrition were categorized into four general areas: size variables, financial variables, faculty variables, and miscellaneous variables. The list of variables under each of the above categories may be found in Table 2. It should be noted that the estimates for each variable used in the present study were based on either calendar 1970 or Fiscal 1971 school data.

Procedures

A total of 102 U.S. medical schools which had at least 10 salaried faculty on staff in calendar 1970 were initially included in the study. Seven schools were missing substantial amounts of data and were dropped from the analysis, leaving a total of 95 schools.

The model used for predicting faculty attrition (criterion) using multiple predictors was stepwise multiple regression analysis. Zero-order Pearson Product Moment correlations were also presented and discussed. The multiple regression was terminated when the multiple R increased by less than .02.

Operational definitions of the predictors are shown in Table 2. Upon examination of the predictor data for each of the 102 schools, it was noted that 15 schools had no information concerning faculty salary. In order to determine if the schools with missing data were different from the remaining schools, "F" tests were conducted between the schools with missing salary data and the schools with salary data on all predictor variables in common. The results were not significant on all variables at the .05 level. Therefore, results from analyses on the schools with salary information would not be expected to be different from that of the other schools without salary information.

TABLE 1

Immediate Employment Plans[1]
Of Separated 1970 Medical School
Salaried Faculty

EMPLOYMENT PLANS:	NUMBER	PERCENTAGE
A Faculty Transfer:		
- Other U.S. Medical School	738[2]	33
- U.S. Non-Medical School	72	3
- Foreign School	34	2
Volunteer at Same School	319	14
Private Practice	352	16
Military Service	32	1
U.S. Government	41	2
Private Business or Industry	29	1
Relocated to Foreign Country	80	4
Contract Not Renewed	53	2
Resigned - Reason Unknown	460	21
	2210	100%

(1) Excludes faculty who were on leave, retired or deceased.

(2) According to other sources, only 613 medical school faculty actually transfered to another medical school between 1970 and 1971 (Anderson, and Larson, 1974).

TABLE 2

Operational Definitions Of Institutional Predictor Variables

Institutional Size Variables:

1. Total Faculty: Total Salaried Faculty in 1970.

2. Total Students: Total number of 1970 undergraduate medical students, interns, residents, pre- and post-doctoral students in the basic sciences and full-time medical student equivalents or students other than undergraduate medical students.

3. Medical Students: Total reported number of M.D. candidate medical students who were enrolled for any portion of the 1970 academic year.

4. Interns: Number of interns per medical school.

5. Residents: Number of residents per medical school.

6. House Staff: Total number of interns and residents per medical school.

Institutional Financial Variables:

7. Ownership: Public or Private Control of Medical School

8. Total College Expenditures: Total sponsored programs and regular operating expenditures.

9. Sponsored Research: Includes income from both public and private sources that is restricted for research.

10. Research per Faculty: Average amount of sponsored research per total salaried faculty.

11. Expenditure per Student: Average total college expenditure per student.

Institutional Faculty Variables:

12. Percent Full Professors: Percent total salaried full professors at medical school

13. Percent Assoc. Professors: Percent total salaried associate professors at medical school.

14. Percent Associate and Full Professors: Percent of associate and full professors at medical school.

15. Percent Inbred: Percent of M.D. faculty having received M.D. degree at same institution of employment

16. NIH Participation: Percent of faculty who are or have participated in an NIH Training Program (excludes NIMH).

17. Federal Participation: Percent of faculty who are or have participated in other federal programs (including NIH).

18. Age (Associate Professor): Average age of associate professors at medical school.

19. Age (Full Professor): Average age of full professors at medical school.

20. Age (Total Faculty): Average age of total salaried faculty at medical school.

21. Percent Foreign Medical: Percent of M.D. faculty who are foreign medical graduates.

22. Percent M.D.-Ph.D.: Percent of total faculty having both an M.D. and Ph.D. degree.

23. Percent non-M.D.: Percent of total faculty without an M.D. degree.

24. Student-Faculty ratio: Ratio of the number of total students to the total salaried faculty.

Other Institutional Descriptors

25. MCAT Science Score: Mean score for all entrants to the first year 1970 class on the Science Subtest of the MCAT.

26. Age of School: The earliest date of the entering medical student class in a four year program (logarithm).

27. Population Density: The measure of area population per square mile.[4]

Regression analysis on the 84 schools indicated that faculty salary was not a significant predictor of faculty attrition. Therefore, final reported regression analyses were conducted on all 95 schools without using salary as a predictor.

RESULTS

Table 3 shows means and standard deviations for all variables. The criterion, percent faculty attrition, had a computed mean of 7.0 and a standard deviation of 3.12 with a range of institutional scores from 0. to 23.5 percent faculty attrition.

Table 4 shows zero order inter-correlations among the four variables in the final regression equation. Table 4 indicates that none of the predictors are highly related to the criterion. An examination of the zero order correlations indicates that age of institution and percent of foreign medical graduates were significantly correlated with faculty attrition, the criterion (.05 level).

Table 5 gives the regression equation for four predictors against the criterion. The multiple R was .47 which was significant (.05 level). The four variables which optimally predicted the criterion of faculty attrition were: 1) age of the medical school; 2) percent of inbred faculty; 3) mean age of associate professors; and 4) percent of foreign medical graduates on staff.

DISCUSSION

The notable finding in the present study reflects the low correlation of the 27 institutional predictor variables with the criterion. It may be that other institutional variables were not included in the present study which relate to faculty attrition. For instance, an estimate of the unfilled budgeted positions at a medical school or the general economic conditions surrounding the medical schools may be related to attrition.

Another possibility is that there may be relatively few variables that capture the variance in common among medical schools regarding faculty attrition.

There appears to be no obvious relationship or common element among the four variables which optimally predicted faculty attrition. How can we conceptualize a medical school by the equation, i.e., describe a school who scores high on faculty attrition? The positive and negative weights in Table 5 suggest that medical schools that have a high degree of faculty attrition differ from other medical schools by having more foreign medical graduates on staff; were established at an earlier date, but have younger associate professors,and tend to have fewer faculty who are graduates of that institution.

The observation of higher mobility among foreign medical graduates was previously noted by Anderson and Larson (1974). They suggested that FMG's do not have the attachments or roots to a specific locale and may tend to move more frequently than

TABLE 3

Means and Standard Deviations of

Predictors and Criterion
N = 95 Schools

		MEAN	STANDARD DEVIATION
1.	Total Faculty	313	170
2.	Total Students	1154	721
3.	Medical Students	400	186
4.	Interns	52	41
5.	Residents	224	162
6.	House Staff	276	198
7.	Ownership	1.45	.50
8.	Total College Expenditures	18,046,000	11,900,000
9.	Sponsored Research	5,031,000	4,600,000
10.	Research Per Faculty	15,000	9,700
11.	Expenditure Per Student	18,000	12,800
12.	Percent Full Professors	24.19	6.42
13.	Percent Associate Professors	23.02	4.19
14.	Percent Assoc. Full Prof.	47.21	8.22
15.	Percent Inbred	21.05	14.67
16.	NIH Participation	26.71	14.0
17.	Federal Participation	41.71	13.59
18.	Age (Associate Professor)	43.95	2.03
19.	Age (Full Professor)	50.83	2.25
20.	Age (Total Faculty)	42.47	1.69
21.	Percent Foreign Medical	17.40	8.76
22.	Percnet MD-PhD	5.98	2.73
23.	Percent Non-MD	36.44	10.41
24.	Student/Faculty Ratio	3.89	1.68
25.	MCAT Science Score	558	3[illegible].49
26.	Age of School (log)	1.65	.58
27.	Population Density	7758	7081
28.	Percent Faculty Attrition (Criterion)	7.00	3.12

TABLE 4

Zero Order Inter-Correlations Among
Variables in Final Regression Equation*

	1.	2.	3.	4.	5. (Criterion)
1. Age of Institution	-	.68*	.39*	.03	.25*
2. Percent of Faculty Inbred		-	.27*	-.08	-.04
3. Mean Age of Associate Professors			-	.33*	-.05
4. Percent Foreign Medical				-	.20*
5. Percent Faculty Attrition(Criterion)					-

* Significant at .05 level

TABLE 5

Regression Equation for Four
Predictors*

19.55 (Constant) + 3.12 (Age of Institution) - 7.44 (Percent of Inbred Faculty) - .40 (Age of Associate Professor) + .086 (Percent Foreign Medical Graduates).

*Multiple R = .47, Significant at .05 level. See Table 2 for definitions of variables.

U.S. medical graduates. This explanation may also have bearing on the related finding that institutions with lower percentages of inbred faculty have higher percentages of faculty attrition. Yett and Sloan (1971) have previously reported that the practice location of M.D.'s is related to the number of "events" in the pre-practice period (i.e., birth, medical school, internship and residency). If this phenomenon is true for M.D.'s in academic medicine, it would explain in part the contribution of the inbred finding on attrition.

A younger mean age of faculty at the associate or full professor rank, a finding which suggests early promotion practices at a medical school, may result in lower faculty attrition. However, the related finding indicating that younger associate professors were found at higher attrition institutions is a slight reversal in the expected findings.

Perhaps a younger mean age for associate or full professors is indicative of a large turnover of older professors in these ranks. It should be emphasized, however, that no cause and effect relationship may be inferred from the data in this survey.

In summary, only two of the 27 institutional variables used to predict high faculty attrition were effective independently. Step-wise multiple regression procedures indicated that four variables optimally predicted the criterion. However, these four variables accounted for only 22 percent of the variance. A study that could collect additional institutional variables that were unavailable for the present report would be in order. Perhaps the occurrence of high faculty attrition should be investigated longitudinally since 1970, to observe possible patterns of excessive faculty attrition.

FOOTNOTES

1. "Functions and Structure of a Medical School, The Liaison Committee on Medical Education," Association of American Medical Colleges, Washington, D. C., June 1973.

2. Physician Manpower and Distribution: The Primary Care Physician, Coordinating Council on Medical Education, AAMC, Washington, D. C., 1971, pp. 10-11.

3. Separated faculty is differentiated from departed faculty (Anderson and Larson, 1974) in that separated faculty does not include faculty who were on leave, retired or deceased.

4. U. S. Bureau of the Census, Statistical Abstract of the United States: 1971. (92nd edition) Washington, D. C., 1971.

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